Examiner rejected claim 22 under 35 U.S.C. § 103(a) as being unpatentable over Cummins or Koyama, in view of Opris (US Patent No. 6,130,632). Applicants respectfully traverse the rejections and request reconsideration.

I. Section 102 Rejections

A. Cummins (US Patent No. 5,570,090) Fails to Show Each Element of the Claimed Invention

The Examiner rejected claims 1-4, 7, 9-15 and 20-22 under 35 U.S.C. § 102(b) as being anticipated by Cummins (US Patent No. 5,570,090). However, Cummins fails to show each element of the claimed invention and, therefore, does not anticipate claims 1-4, 7, 9-15 and 20-22.

Cummins shows a video digital-to-analog converter with digitally programmable gain and sync level generator circuitry. *See* Cummins FIGs. 7A-7B. The sync level generator circuitry is integrated with the video digital-to-analog converter circuitry, FIG. 7B, so that the sync signal levels track changes made, in accordance with the digitally programmable gain, to the full-scale operating output range. The programmable gain aspect of the circuitry allows the video digital-to-analog converter to generate any of the video waveforms shown in Cummins FIGS 3-6, with the waveform selection being determined in accordance with "an externally supplied digital control signal (A, B, C)." *See* Cummins Col. 3, lines 54-61 and Col. 4, lines 39-46; *see also* FIG. 8 (providing the association between waveforms and the externally supplied digital control signal). Cummins also shows several auxiliary current sources (including the sync level generator circuitry) that are integrated with the video digital-to-analog converter circuitry, FIG. 7B, so that the video levels generated will track the full-scale output current of the video digital-to-analog converter over voltage, process and temperature variations. *See, e.g.,* Col. 2, lines 25-32, Col. 5, lines 26-29 and 46-56; Col. 6, lines 40-43. The auxiliary current sources' tracking of the video digital-to-analog converter output level stems from Cummins use of a common gate bias line 30, the voltage of which is set by the "DAC current set 32" circuitry. *See, e.g.,* FIG. 7A and Col. 2, lines 2-24.

Cummins fails, however, to show the invention as claimed. As an initial matter, the Examiner states that "Cummins disclose a current mode driver DAC circuit (Fig. 7A, 7B)." Claim



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1, however, recites "A method for improving resolution of a current mode driver . . . ." Cummins shows a video DAC whose output may vary to drive different CRTs (different video standards (e.g., Cummins Fig. 8)), but fails to even mention any technique for improving resolution of the driver. Cummins is not concerned with resolution, but rather is directed to providing one circuit that is capable of providing the different standardized video drive levels (in response to an external input). All claims of the present application, like claim 1, relate to improving resolution of the driver.

In addition, Cummins fails to show the claimed sensing step. Independent claims 1 and 11 include "sensing at least one of a process condition, a voltage condition and a temperature condition." The Examiner states that Cummins discloses "sensing at least one of a process condition, a voltage condition, and a temperature condition (Cummins Col. 5, lines 55-56)." But, Cummins fails to show any PVT sense step whatsoever, much less the "PVT detector" recited in independent claims 1 and 11. Instead, Cummins utilizes a common gate bias line 30 to assure that signal levels produced in the video DAC track over process, voltage and temperature variations (see Fig. 7A, Col. 5, lines 51-56, Col. 6, lines 41-43). In other words, it appears that the Cummins architecture assumes that PVT variations will occur, but is not concerned with such variations because all relevant signal levels will be affected in the same manner (i.e. they track).

Furthermore, Cummins fails to show the adjusting step of claim 1 or the generating steps of claim 11. Cummins fails to show adjusting a DAC output "in accordance with an output of the PVT detector," as recited in claim 1, and fails to show "generating a[n] . . . adjustment signal at the PVT detector," as recited in claim 11. As noted above, the "sensing step" relates to sensing a process condition, a voltage condition and/or a temperature condition. Cummins disclosure of adding current based on assertion of the SYNC signal is insufficient. In the absence of a PVT sensor, one cannot adjust a full scale current "in accordance with an output of the PVT detector."

Moreover, Cummins fails to show "setting a current control signal based on an output of the DAC, the current control signal being applied to the current mode driver to improve resolution of the current mode driver," as recited in claim 1. In the present Action, the only reference to "setting a current control based on an output of the DAC" is at the bottom of page 2, where Cummins Fig. 8 and Table 1 in Col. 6 are cited. However, Cummins sets a current control signal ["ABC"—Col. 2 of Fig. 8] based on a "Desired Video Level" [Col. 1 of Fig. 8]. It is clear from Fig. 7 that there is no



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feedback in Cummins' DAC, i.e., the output is not monitored to set the "ABC" code. Instead, the "ABC" code is an "*externally supplied* digital control signal." (Cummins Col. 4, lines 39-46(emphasis added)).

Further with respect to claim 11, Cummins fails to show "calibrating the altered full scale current of the output driver and the altered second current of the output driver by comparing the altered full scale current with a first reference and comparing the altered second current with a second reference."

Because Cummins fails to show any kind of PVT detector, fails to show the claimed adjusting and generating steps, fails to show "setting a current control signal based on an output of the DAC, the current control signal being applied to the current mode driver to improve resolution of the current mode driver," as recited in claim 1, and fails to show "calibrating the altered full scale current of the output driver and the altered second current of the output driver by comparing the altered full scale current with a first reference and comparing the altered second current with a second reference," as recited in claim 11, claims 1and 11 not anticipated by Cummins.

Claims 2-4, 7, 9-14 and 21-22 depend ultimately from either claim 1 or claim 11, and therefore the allowance of claims 2-4, 7, 9-14 and 21-22 will follow directly from the allowance of claims 1 and 11. Cummins also fails to show certain elements of these dependent claims. For example, Cummins fails to show a "sensing step compris[ing] sensing a PVT sensitive AC parameter," as recited in claim 10. In particular, the SYNC and TRISTNC signals of Cummins are not PVT sensitive AC parameters. Claim 10 is allowable for this additional reason. Moreover, Cummins fails to show a current mode driver that comprises a multi-PAM signal generator coupled to a bus, as recited in claim 21. Instead, Cummins shows a current mode driver coupled via a DAC to a CRT. Cummins therefore fails to anticipate claims 21 and 22.

With respect to claim 15, Cummins fails to show all elements of the claimed invention. For example, claim 15 recites, "the digital-to-analog converter providing a first output . . . applying the first output as a gate voltage to control a full scale current of an output driver." Cummins shows no such use of an output of the digital-to-analog converter. Instead, Cummins uses the digital-to-analog converter output to "develop signals for various types of CRT displays." Col. 1, lines 6-10. Nor does Cummins show "calibrating the output driver by comparing a second output, which is



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provided by the output driver, with a reference," as recited in claim 15. Cummins is completely silent in regard to calibrating the output of the video digital-to-analog converter. In addition, Cummins fails to show "augmenting the first current control signal when the second output differs from the reference," as recited in claim 15. As noted above, the current control signal is "an externally supplied digital control signal." Cummins fails to describe augmentation of this signal.

Because these elements from claim 15 are not found in Cummins, applicants submit that claim 15 is not anticipated by Cummins. Claim 20 depends from claim 15 and, therefore, its allowance will follow directly from the allowance of claim 15. Moreover, Cummins fails to mention user control of the current control signal. The Action's suggestion of inherency in this regard is completely unsupported. To the contrary, Cummins describes an automated approach based on software control of a computer. *See* Col. 4, lines 43-45.

Because it fails to show the elements noted above, claims 1-4, 7, 9-15 and 20-22 are <u>not</u> anticipated by Cummins (US Patent No. 5,570,090).

B. Koyama (US Patent No. 5,570,582) Fails to Show Each Element of the Claimed Invention

The Examiner rejected claims 1-4, 7, 9-16, 18 and 20 under 35 U.S.C. § 102(b) as being anticipated by Koyama et al. (US Patent No. 5,570,582). Claims 17 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Koyama. However, Koyama fails to show each element of the claimed invention and, therefore, does not anticipate claims 1-4, 7, 9-16, 18 and 20.

Like Cummins, Koyama shows a video digital-to-analog converter. Koyama shows in FIG. 1 a 256-bit digital-to-analog converter comprising constant current circuits L1-L255. During a non-display period, the output currents of the constant current circuits L1-L255 are collected at the non-output terminal 42, where a voltage is generated across resistor R'. A controller 36 controls switches A, B, and C based on at least one of a horizontal sync signal 17, a vertical sync signal 18 and a blanking signal 19. During a non-display period the controller 36 closes switches A and B, and opens switch C, This causes the voltage at 42 to be applied to a differential amplifier 34, which applies a gate voltage consonant with the difference between the voltage 42 and a reference voltage Vref to the switches S3. *See* Col. 7, lines 20-48.



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Koyama fails, however, to show the invention as claimed. In particular, with respect to claim 1, Koyama fails to show "setting a current control signal based on an output of the DAC, the current control signal being applied to the current mode driver to improve resolution of the current mode driver." In this regard, the Action merely states that Koyama shows "setting a current control signal based on an output of the DAC (36) . . . the current control signal comprises a plurality of bits (36). The controller (36) of Koyama, however, generates control signals based on the video blanking, horizontal sync and vertical sync signals, **not** based on the output of the DAC. There appears to be no logical or electrical relationship between the DAC output and the controller (36) output. Nor is the controller (36) output applied to a current mode driver, as recited in claim 1. Instead, the controller (36) applies control signals to switches A, B and C. Accordingly, Koyama fails to anticipate Claim 1.

Claims 2-4, 7, and 9-10 depend ultimately from claim 1 and the allowance of claims 2-4, 7, and 9-10 will follow directly from the allowance of claim 1. In addition, Koyama fails to show certain elements of these dependent claims. For example, Koyama fails to show a "sensing step compris[ing] sensing a PVT sensitive AC parameter," as recited in claim 10. The Action's suggestion that the PVT sensitive AC parameter is inherent is inaccurate. It simply does not follow that the claimed step of sensing a PVT sensitive AC parameter is met merely because Koyama's circuit performs a digital-to-analog conversion.

With respect to claim 11, in addition to the reasons above, Koyama fails to show any of the following steps: 1) "applying the current control signal to cause the output driver to sink a second current, wherein the second current is less than the full scale current"; 2) "generating a second current adjustment signal at the PVT detector"; 3) "applying the second current adjustment signal to alter the second current of the output driver"; and 4) "calibrating the altered full scale current of the output driver and the altered second current of the output driver by comparing the altered full scale current with a first reference and comparing the altered second current with a second reference." At the very least it is clear that Koyama does not calibrate different current levels against different references. Nor is there even a suggestion in Koyama to apply and alter lass than the full scale current. Accordingly, Koyama fails to anticipate claim 11.

Claims 12-14 depend ultimately from claim 11. The allowance of claims 12-14 will



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therefore follow directly from the allowance of claim 11.

With respect to claim 15, Koyama fails to show "the digital-to-analog converter providing a first output . . . applying the first output as a gate voltage to control a full scale current of an output driver." Instead, Koyama shows applying an output of a digital-to-analog converter to an input of a differential amplifier 34. The input of the differential amplifier is not a "gate voltage" as claimed. Claim 15 recites a digital-to-analog converter providing a first output and an output driver providing a second output. Koyama's video digital-to-analog converter lacks an output driver. It merely shows a digital-to-analog converter, resistor, differential amplifier, and controller. Koyama therefore also lacks the claimed step of calibrating the output driver by comparing a second output, provided by the output driver, with a reference, as recited in claim 15. Nor does Koyama show the step of "augmenting the first current control signal when the second output differs from the reference," as recited in claim 15.

Claims 16, 18 and 20 depend ultimately from claim 15. The allowance of claims 16, 18 and 20 will therefore follow directly from the allowance of claim 15. These dependent claims contain additional elements that are not shown by Koyama, but a detailed discussion is not provided in light of the foregoing. In addition, as noted above with respect to claim 20 and the rejection under Cummins, the application of a current control signal under user control is in no way inherent in Koyama.

II. Section 103 Rejections.

Claims 17 and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Koyama. Furthermore, the Examiner rejected claims 5 and 6 under 35 U.S.C. § 103(a) as being unpatentable over Cummins or Koyama in view of Hicks (US Patent No. 6,015,233). Finally, the Examiner rejected claim 22 under 35 U.S.C. § 103(a) as being unpatentable over Cummins or Koyama, in view of Opris (US Patent No. 6,130,632). Because each of these claims depends from an independent claim discussed above, the allowance of claims 5, 6, 17, 19 and 22 will follow directly from the allowance of claims 1 and 15.

In addition, Hicks is clearly not analogous to either the pending claims or the video DACs



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shown in Cummins or Koyama. Hicks states, "Field of the Invention-- This invention relates to monitoring the temperature of rotating devices used in industrial applications such as paper milling, textiles, food processing, pharmaceuticals, chemicals, power generation, motors, generators, bearings, engines and the like." One skilled in the art of video DACs would not look to the field of rotating devices in industrial applications. It would therefore appear that this combination would only be made using improper hindsight knowledge of the present application. The rejection based on the combination with Hicks is therefore improper, and claims 5 and 6 are not rendered obviuos.

III. Conclusion

In light of the foregoing remarks, applicants respectfully submit that the present application is in condition for allowance and such action is respectfully requested. The applicants invite the Examiner to call the undersigned at (312) 913-0001 with any questions or comments.

Respectfully submitted,

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